

REMARKS

The Official Action mailed July 29, 2002 has been received and its contents carefully noted. Filed concurrently herewith is a *Request for One Month Extension of Time*, which extends the shortened statutory period for response to November 29, 2002. Accordingly, Applicant respectfully submits that this response is being timely filed.

Applicants note with appreciation the consideration of the Information Disclosure Statements filed on April 26, 2001 and May 17, 2002.

Claims 1-15 are pending in the present application, of which claims 1-4 and 13-15 are independent. All independent claims are amended herewith to recite that contaminant impurities on a surface of an object are removed by applying an etching solution or an acid solution while spinning a substrate on which the object is formed. As discussed below, it is respectfully submitted that the prior art of record fails to disclose or suggest this feature of the present invention and favorable reconsideration is respectfully requested.


Paragraph 2 of the Official Action rejects claims 1-4 as lacking antecedent basis for the term "atmosphere" in the last limitation. In response to Applicant's earlier arguments that one of skill in the art would understand "atmosphere" to be the ambient gaseous state found outside the semiconductor manufacturing device, the Official Action asserts that there is an "atmosphere" in the chamber, another in the clean room and another outside the clean room and it is unclear as to which the claims would refer. Therefore, to avoid any possible uncertainty, these claims have been amended to recite "air." It is respectfully submitted that this is sufficient to obviate any indefiniteness in the claims and favorable reconsideration is requested.

Paragraph 4 of the Official Action rejects claims 1-15 as obvious based on the combination of U.S. Patent 5,773,325 to Teramoto, U.S. Patent 6,313,017 to Varhue and U.S. Patent 5,181,985 to Lampert. In response, Applicants have amended all independent claims to recite that contaminant impurities on a surface of an object are removed by applying an etching solution or an acid solution while spinning a substrate on which the object is formed. This feature is supported by at least page 3, lines 12-18 of the specification. No references appear to teach or suggest applying the etching solution or the acid solution to the object while spinning the substrate. Therefore, since

the prior art, taken alone or in combination, fails to disclose or suggest every limitation recited in the claims, it is respectfully submitted that a *prima facie* case of obviousness cannot be maintained. Favorable reconsideration is requested.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend claims 1-4 and 13-14 as follows:

1. (Twice Amended) A method for manufacturing a semiconductor device comprising:
 - the first step of forming a semiconductor film over a substrate;
 - the second step of etching the semiconductor film to remove contaminant impurities on a surface of said semiconductor film by applying an etching solution while spinning the substrate; and
 - the third step of forming a gate insulating film in contact with said semiconductor film after said second step,wherein said second and third steps are performed in sequence without being exposed to [the atmosphere] air.

2. (Twice Amended) A method for manufacturing a semiconductor device comprising:
 - the first step of forming an amorphous semiconductor film over a substrate;
 - the second step of forming a crystalline semiconductor film by crystallizing said amorphous semiconductor film;
 - the third step of forming an island-shaped crystalline semiconductor layer by patterning said crystalline semiconductor film;
 - the fourth step of etching the island-shaped crystalline semiconductor layer to remove contaminant impurities on a surface of said crystalline semiconductor layer by applying an etching solution while spinning the substrate; and
 - the fifth step of forming a gate insulating film in contact with said crystalline semiconductor layer after said fourth step,wherein said fourth and fifth steps are performed in sequence without being exposed to [the atmosphere] air.

3. (Twice Amended) A method for manufacturing a semiconductor device comprising:

the first step of forming a base film over a substrate;

the second step of etching the base film to remove contaminant impurities on a surface of said base film by applying an etching solution while spinning the substrate; and

the third step of forming a semiconductor film in contact with said base film after said second step,

wherein said second and third steps are performed in sequence without being exposed to [the atmosphere] air.

4. (Twice Amended) A method for manufacturing a semiconductor device comprising:

a step of forming a gate insulating film over a substrate;

a step of etching the gate insulating film to remove contaminant impurities on a surface of said gate insulating film by applying an etching solution while spinning the substrate; and

a step of forming a gate conductive film in contact with said gate insulating film after said contaminant impurities are removed,

wherein said step of etching the gate insulating film to remove said contaminant impurities and said step of forming said gate conductive film are performed in sequence without being exposed to [the atmosphere] air.

13. (Amended) A method for manufacturing a semiconductor device comprising:

forming a semiconductor film over a substrate;

washing a surface of the semiconductor film with pure water in which ozone is dissolved;

etching the surface of the semiconductor film with an acid solution which includes fluorine to remove at least one of B, Na, K, Mg, and Ca by applying the acid solution while spinning the substrate; and

forming a gate insulating film in contact with said semiconductor film.

14. (Amended) A method for manufacturing a semiconductor device comprising:

forming a base film over a substrate;

washing a surface of the base film with pure water in which ozone is dissolved;

etching the surface of the base film with an acid solution which includes fluorine to remove at least one of B, Na, K, Mg, and Ca by applying the acid solution while spinning the substrate; and

forming a semiconductor film in contact with said base film.

15. (Amended) A method for manufacturing a semiconductor device comprising:

forming a gate insulating film over a substrate;

washing a surface of the gate insulating film with pure water in which ozone is dissolved;

etching the surface of the gate insulating film with an acid solution which includes fluorine to remove at least one of B, Na, K, Mg, and Ca by applying the acid solution while spinning the substrate; and

[a step of] forming a gate conductive film in contact with said gate insulating film after said contaminant impurities are removed.